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## **JUICER**

### **5 FIELD OF THE INVENTION**

Invention pertains to juicers and more particularly to a juicer for fruit and vegetables.

### **10 BACKGROUND OF THE INVENTION**

Fruit and vegetable juicers are well known. Appliances of this kind are sometimes prone to leakage of the extracted juice from within the confines of the juicer's casing.

Juicers are also known to vibrate and therefore move on the bench top on which they are placed. In existing juicers, the lid and feed tube are generally integrally molded from a polymer material. The polymer having the advantage that it can be moulded in a transparent material to view the flow of pulp to ensure there are no blockages.

Where the feed tube includes an internal knife, this is also a part of the unitary molding. Steel is stronger than the moulded polymers used for this purpose but forming the complex shapes required to fabricate the lid, feed tube and knife have not previously been solved.

### **OBJECTS AND SUMMARY OF THE INVENTION**

The object of the invention is to address some of the shortcomings of the prior art for the purpose of providing a superior or commercially more acceptable alternative to known juicing appliances

### **BRIEF DESCRIPTION OF THE DRAWING FIGURES**

30

Figure 1 is a front elevation of a juicer, pulp collector and juice collecting jug according to the teachings of the present invention;

Figure 2 is a perspective view of a juicer with the lid off;

Figure 3 is a cross sectional view of the top of the juicer depicted in figure 1;

- Figure 4 is a front cross sectional view of a juicer and pulp collector;  
Figure 5 is a top plan view of the device depicted in figure 1;  
Figures 6(a&b) are front and rear perspectives of a juice jug;  
Figure 7 is a cross sectional view of the jug depicted in figures 6(a) and 6 (b);  
5 Figure 8 is a cross sectional view through the lid, feed tube and knife;  
Figure 9 is a cross sectional view through the juicer;  
Figure 10 is a cross sectional view of the device depicted in figure 1;  
Figure 11 is a partially cross sectioned view of a juicer, and a specially configured stand;  
10 Figure 12 is an exploded perspective view of a juicer according to teachings of the present invention; and  
Figure 13 is an exploded perspective of the lid.  
Figure 14 (a) is a perspective view of a pusher.  
Figure 14 (a) is a perspective view of a pusher, partially exploded.

15

## BEST MODE AND OTHER EMBODIMENTS OF THE INVENTION

### General

- 20 As shown in figure 1, a juicer 10 comprises a housing 11 a lid with feed tube 12, a pulp collector 13 and a collection jug 14.

The housing 11 further consists of a lower compartment 15 and an upper compartment or juice collector 16. The lower compartment 15 houses the juicer's  
25 motor, controls 17 and power supply. The lower compartment 15 further includes a lower rim 19 which is flared outward. For maximum stability, the device's feet 18 are mounted under the flared rim 19. In preferred embodiments, the feet have rubber bottoms in which are formed indentations 18a, as will be explained.

### 30 Juice Collector

As shown in figures 1-4 the upper compartment or juice collector is a removable component preferably fabricated from stainless steel. As seen in figure 3, the interior compartment or collection reservoir 16a of the juice collector 16 comprises a central

opening 21 which is surrounded by an upturned rim 22. The collection reservoir of the juice collector 16 is defined by an exterior wall 23. The upper extremity of the interior compartment is defined by a horizontal rim 24 which surrounds a central opening 25. This rim 24 prevents juice from escaping from, and pulp from entering the reservoir 16a. Integral with the exterior wall 23 and horizontal rim 24 is a juice stopping rim 26 which is inclined slightly from the vertical and which terminates in the 'U' or 'J' shaped rim 27.

As shown better in figure 2, the juice stopping ring 26 includes a pair of opposed indentations 30 for locating tabs protruding from the underside of the lid to orientate the lid with respect to the juice collector. It will be observed that the juice stopping rim 26 does not completely surround the juice collector's sidewall 23. Instead, the juice stopping ring 26 includes a gap 32. The sides of the gap 32 are defined by the tapered or rolled off portions of 33 of the juice stopping ring 26 and thereby define a spout. This spout further comprises a down turned lip portion 34, which is shown in figure 3 and extends below the level of the horizontal rim 24. Accordingly, a gap 35 is formed between the lip 34 and the sidewall 23 which gap is able to accommodate a rim of the pulp collector 13 or a pulp disposal chute as will be further explained. These features provide for a highly efficient flow of waste pulp into the collector 13 or chute.

#### Pulp Collector

As shown in figures 1-4 and 10, the pulp collector 13 comprises a container with a generally 'D' shaped cross section which conforms to the exterior of the housing 11. In preferred embodiments, the upper rim 40 of the pulp collector 13 includes an arcuate or concave portion adjacent (in use) to the housing 11. As shown in figure 3, the concave portion 41 of the rim 40 closely conforms to the outer surface of the side wall 23 and fits into the gap 35 defined by the descending lip 34 and the side wall 23. The upper rim 40 also includes an enlargement 42 which forms a convenient grip. In preferred embodiments one entire side of the pulp collector 13 is concave so to conform to the exterior shape of the housing 11. It is also preferred that a lower portion 43 of the collector 13, adjacent the housing 11 be indented so as to conform with the enlarged rim 19 of the housing 11. Importantly, when the pulp collector 13 is

in use, both the descending lip 34 of the spout 32 and the side wall portions 33 extend below the level of the upper rim 40 of the collector 13.

5 The top inside surface of the pulp collector 40 must closely fit the surfaces of the lid to prevent the leakage of air and fluids 52. This can make the pulp collector difficult to remove. To overcome this the interior of the pulp collector 40 also has one or more vertical ribs 140 near it rim 40 as shown in Figures 2 and 3. When the handle 42 of the pulp collector is lifted, this rib acts on the cap as fulcrum to prevent the pulp container from jamming up onto the lid and causing the lip 41 to pivot downward so  
10 that the collector is easily removed.

#### Lid and Feed Tube

15 The lid 12 of the device provides several important functions. It prevents juice from escaping, it diverts pulp efficiently toward the collector 13 or chute 150 (Figure 11), it cooperates with a locking bar 31 to keep the device safe and closed and it provides a platform for the feed tube 51. As shown in figures 1-5 and 8-11, the lid 12 comprises a polymeric cap 52 (for example a polycarbonate) to which is secured a metal, preferably stainless steel (feed tube) 51. As seen from above and as shown best in  
20 figure 5, the cap 52 includes 2 primary lobes and assumes the shape of a figure "8" when seen from above. The larger lobe primarily covers the juice collector and the smaller lobe primarily covers the pulp collector 13 or chute 150. Importantly the combination of clear cap 52 and steel feed tube provides all of the advantages of both, that is, adequate strength in the feed tube and knife and the ability to see under the  
25 cap.

As shown in figure 3, the perimeter of the cap 52, where it contacts the interior of the pulp collector 13 or chute 150 is enlarged 55. This enlargement 55 serves to increase the contact area between the cap 52 and the chute 150 or collector 13 while at the  
30 same time preserving a smooth and continuous internal surface 56 which leads from the area above the juice collector to the exit area 57 of the cap 52. By providing a smooth, transitionless and continuously curving interior surface 56, the cap 52 assists in guiding pulp into the pulp collector 13 or chute 150 without creating air turbulence or discontinuities in the flow path of the pulp which tends to adhere to the under

surface of the cap. The enlargement or rim thickening 55 also ensures there is no space or "well" above the surface for juice to collect and eventually get blown out.

As shown in figure 2, the cap also includes a descending rim 57 which cooperates with the juice stopping rim 26 and generally follows its perimeter contour around the juice collector except in the area of the spout 32. As shown in figures 3-4 and 8-11, the descending rim 57 of the lid 12 extends to the upper surface of the horizontal rim 24 of the juice collector 16 to form a seal. The angle between the outer surface of the descending rim and the inner surface of the juice stopping ring 26 creates a gap 70 because the rim 57 is more vertical than the ring 26. In preferred embodiments, this gap is tapered having its narrowest portion at the bottom and the widest portion at the top. In prior devices and where this gap has been too narrow, juice falling to the bottom of lid's rim would be blown by internal air pressure out of the gap and therefore out of the device. By providing a tapered gap, it is considered that lower air escape velocities and pressure drop within the gap 70, cause juice to collect in the gap rather than be expelled from it. This juice then drains into the pulp container via the juice collector spout 32, 34. This makes the device easier to use and clean. The juice trapping capability of the lid 12 is enhanced by providing a horizontal shoulder 71 in the rim of the cap for the purpose of capping the rim 27 of the juice stopping ring.

The upper surface of the cap 52 features a pair of opposed cam surfaces 59. Each cam surface 59 includes a ramp portion 60 and a detent 61. As is known in devices of this kind, a locking bar 31 is mounted on a pivot 62 which is adapted to both rotate and translate vertically as the underside of the locking bar 31 rides up the ramp 60. This motion of the pivot 62 trips a safety switch, preventing power from reaching the motor unless the locking bar 31 is in its closed position.

As previously mentioned, the lid also serves as a means of locating and supporting the feed tube 51. In preferred embodiments the cap 52 is a transparent polymer such as a polycarbonate or SAN (a styrenic). As shown in figures 8-10 and 12-13, the cap 52 includes a central opening 80 which accommodates a stainless steel feed tube 51. As shown in those figures, the lower interior of the tube 51 is equipped with a tapered knife 81 which is welded into or onto the tube 51. Because the gap 82 between the bottom of the feed tube 83 and the cutting disc at the base of the filter basket 84 is

relatively small, the knife 81 helps to restrain large fruits such apples from tumbling uncontrollably when being juiced by the filter basket.

As shown in figure 13, in order for the cap 52 to restrain the feed tube 51, the feed tube 51 is provided with a circumferential flange 85. The flange 85 has through openings 86 through which pass threaded fasteners 87. A sealing gasket 88 fits between the feed tube 51 and the internal rim 89 of the opening 80. The gasket 88 includes a neck 91 and a surrounding ring 92. The neck 89 seals between the feed tube 51 and the opening's vertical rim 89. The ring portion 92 seals between the flange 85 and the top of the cap 52. The ring portion 92 of the gasket also includes through openings 93 through which the fasteners 87 pass. The fasteners 87 may also pass through recesses 94 formed in the periphery of the opening 80 so as to extend into screw bosses 95 formed in a retaining ring 96 which sits below the cap 52. In this way the gasket 88 is sandwiched in between the feed tube's flange 85 and the retaining ring 96. In preferred embodiments, the ring 96 is made from nylon or another tough plastic which is resistant to cracking and crack propagation. This combination of materials ensures the lid assembly is dishwasher safe.

Also note that the feed tube 51 carries 2 distinct orientation markers which assist in the proper location of the pusher. A first marker 97 is physically formed on the upper rim of the feed tube 51 and a second marker comprises an opening 98 such as a triangular opening formed in the flange 85. The opening 98 cooperates with a similarly shaped bulge 99 formed on the upper surface of the gasket 88. In this way the bulge 99 resides within and is visible in the opening 98 and provides a visual contrast to the stainless steel finish of the flange 85. The first marker interferes with the insertion of the pusher unless the pusher is oriented properly. As shown in figure 14, the pusher 200 is sized to enter the feed tube 51, but only when the pusher's longitudinal slot 201 is aligned with the knife 81. Thus the first marker 97 is aligned with the knife and is able to enter the slot 201. The bottom 202 of the slot is enlarged to make inserting the pusher into the feed tube easier. So that the pusher has a better feel, the upper knob or bulb 203 is enlarged, provided with a rubber grip ring 204 and also provided with an internal weight such as a metal disk 205.

#### Collection Jug

As shown in figures 1, 6, 7 and 10, the utility of the juicer is enhanced by providing a specially configured collection jug 14. As suggested by figure 1, the juice collection compartment 16 includes a tubular output 100 which exits the juice collector from a low point. The jug 14 comprises a body 101, a handle 102 and a lid 103. The handle 102 defines the rear of the jug. Opposite the handle 102, the jug has a spout 104 which defines the front of the jug. The lid 103 has a scalloped exit or relief portion 105 which is generally in alignment with the spout 104. Integral with the lid 103 and located generally below the scalloped portion 105, the lid also includes a pour shield 106. As shown in figure 7, the shield 106 extends downwardly from the under-surface of the lid 103 and forms an entry opening 107 which leads to the spout 104. The bulk of liquids being poured from the jug pass through the entry opening 107 and are generally inhibited from any other flow path because of the line contact between the sides 108 of the shield and the interior surface 109 of the jug. In the way, foam which may appear on the surface of fruit and vegetable juices is not dispensed while liquids from below the surface are able to enter the entry opening 107 and exit through the scalloped portion 105. The lid also has a second relief 110 which cooperates with a gap 112 in the upper rim of the jug 14 to form a port that the output spout tube 100 can enter. Note that the gap or juice entry point is located on the side of the jug and therefore does not interfere with the handle or spout. The orientation of this gap 112 is not on the jug centerline, but closer to the handle so when the jug is tilted on an angle for pouring the level of juice with respect to this gap 112 lowers and therefore does leak from the gap when the jug is poured. The bottom of the jug 130, in the area under the gap 112 is relieved so that the jug can straddle the housing's rim 19. This allows the jug to be located nearer to the housing. After pouring the juice from the spout 104, the remaining foam/froth can be poured from the jug without removing the cap though the gap opening 112.

### 30 Mounting Tray and Chute

As shown in figure 11 a bench top mounting tray 120 may be used in conjunction with the juicer 10 of the present invention. The pressed steel or moulded tray has 3 primary functions. It stabilises the juicer from excessive movement on the bench top,



it locates the juicer over a discharge opening for pulp disposal and it collects fluid drippings.

The tray comprises a contoured surface 121 in which is formed drain channels 122.

- 5 Rear channels 123 are formed in the area which surrounds the jug 14. A central channel conforms to the underside of the housing 11. An island 125 with a central depression 126 is formed centrally of the tray. The front end 127 of the tray includes an exit opening 128 which is defined by a cylindrical guide or collar 129 which extends below the bottom surface of the tray. The collar fits into a cooperating hole
- 10 in a bench top and thereby serves to locate the collar 129 and thus the tray with respect to the hole in the bench top. Bumps 103 formed on the upper surface of the tray interlock with cooperating depressions 18a formed into the feet 18. In this way, the juicer's housing positively interlocks with the tray. This same arrangement can be provided in the converse, that is, with bumps on the feet and depressions in the tray.
- 15 In this way, juice drippings are collected in the channels 122, 124 and proceed around the island 125 so as to avoid the motor's exhaust and run into the discharge opening 129. With the housing properly located on the tray, the discharge opening 129 lies directly below the smaller lobe of the cap 52. In this way a discharge cylinder or chute 150 may be attached to the rim of the cap and extend into engagement with or
- 20 pilot into the discharge opening 129. This allows pulp waste to be discharged directly from the juicer through the bench top into a conduit or waste receptacle.

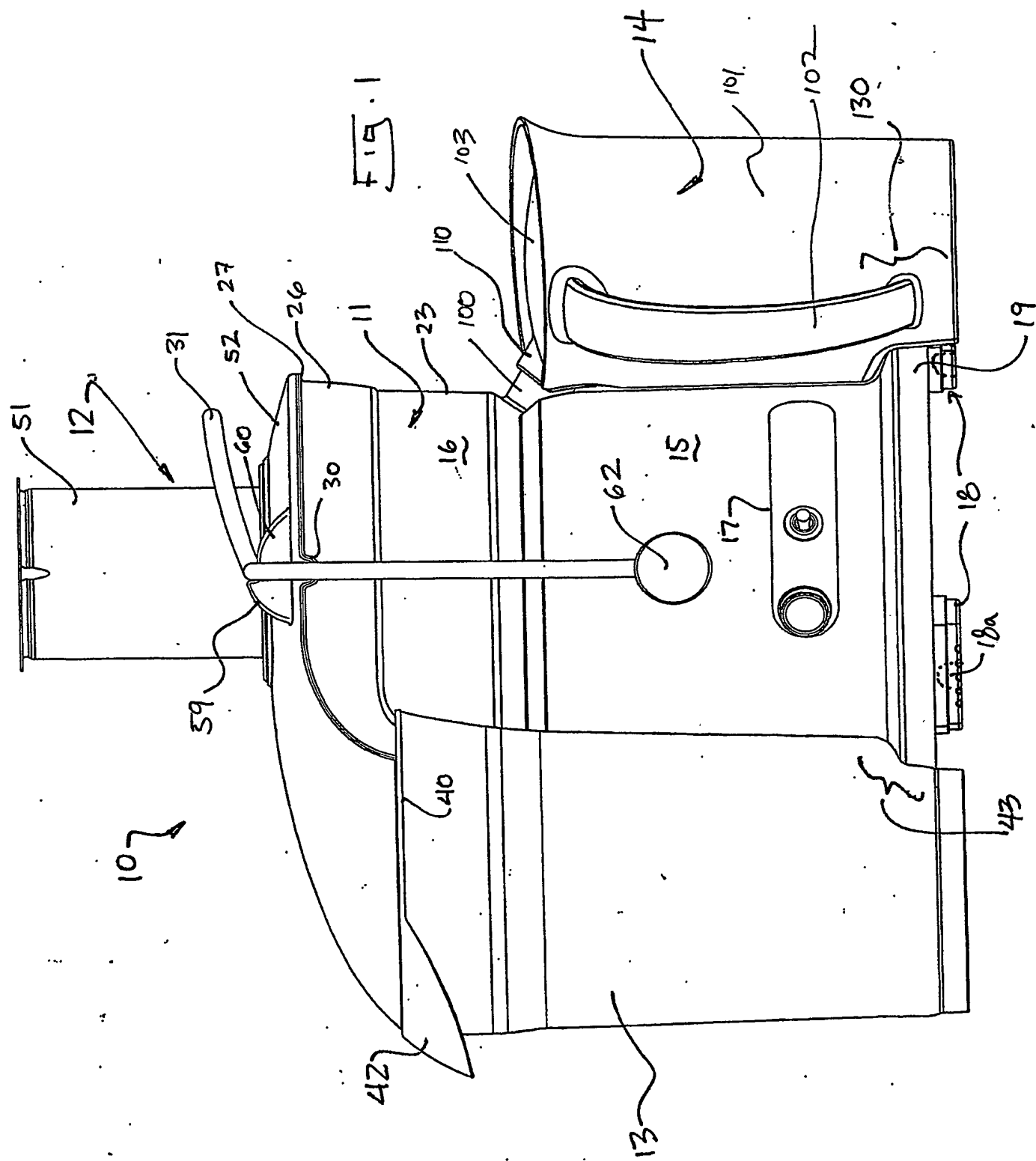


FIG. 2

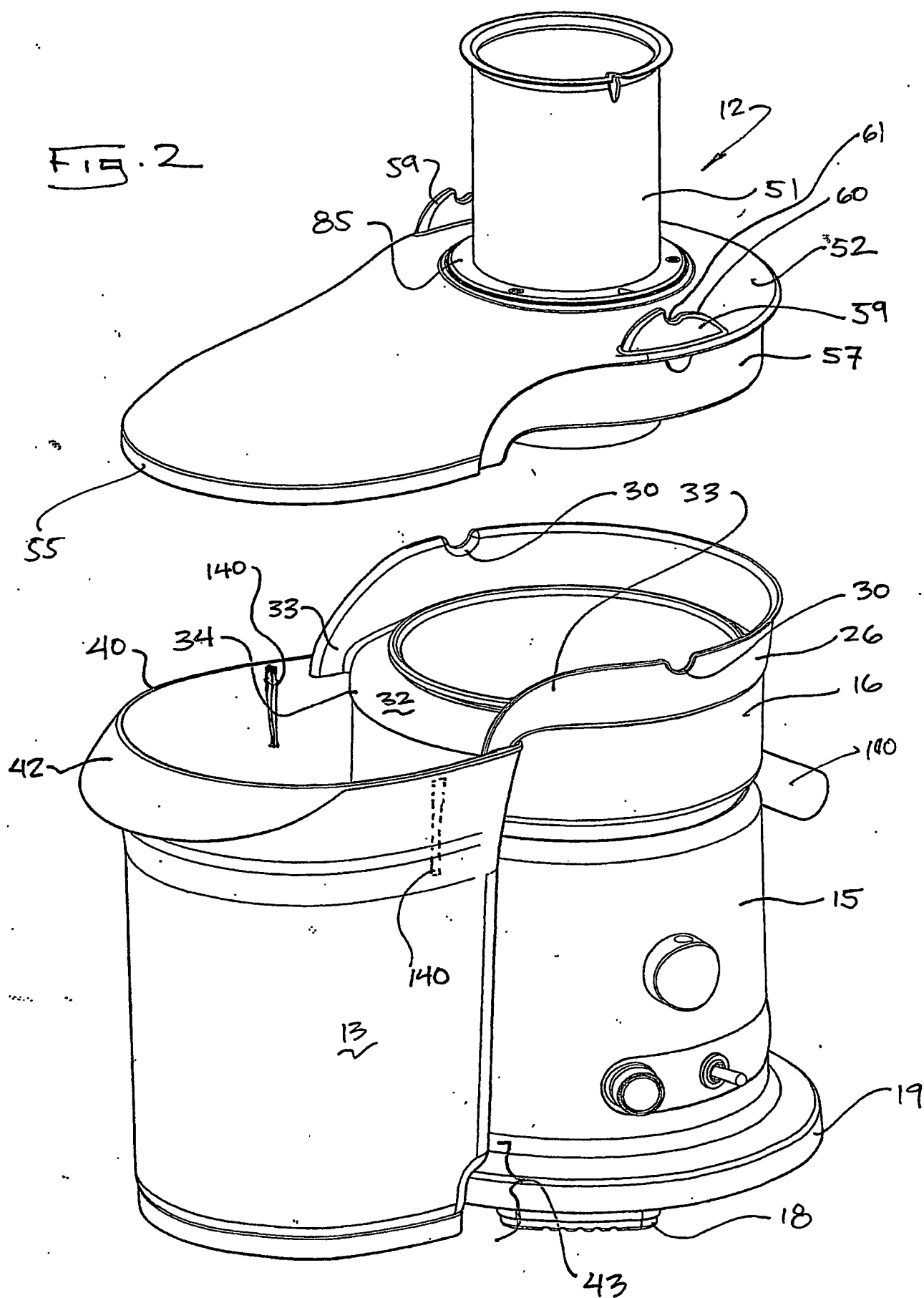


FIG. 3

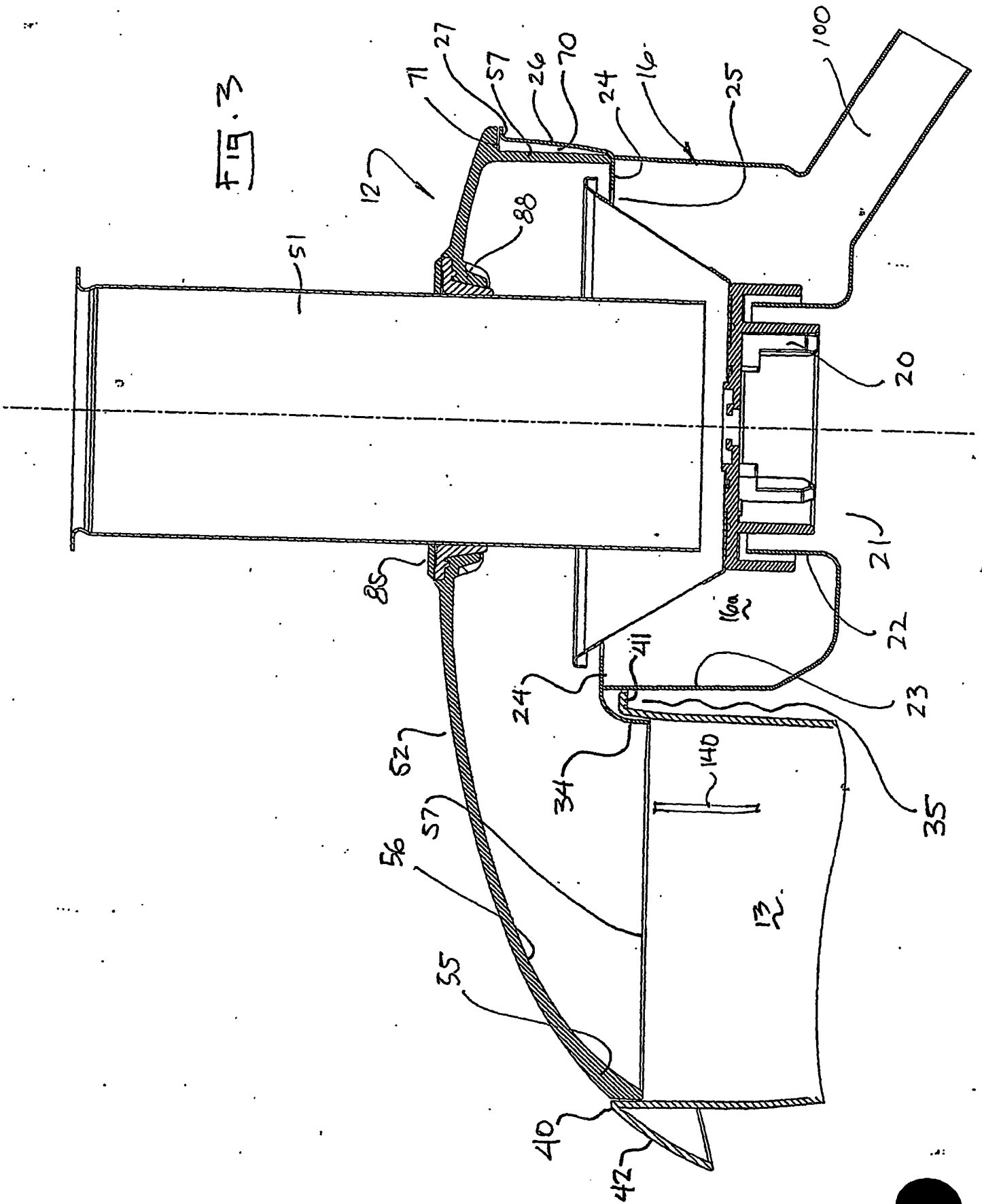
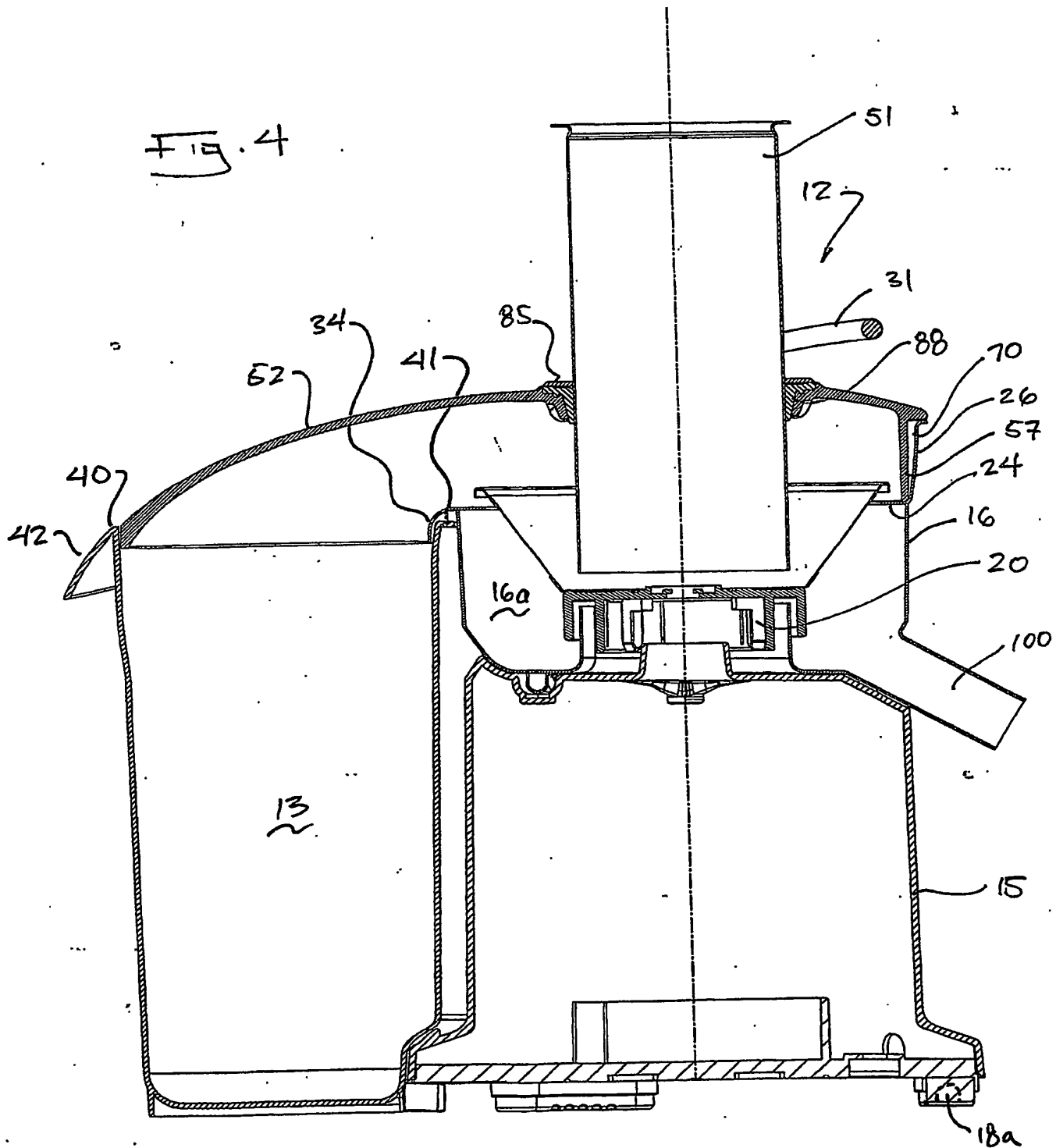
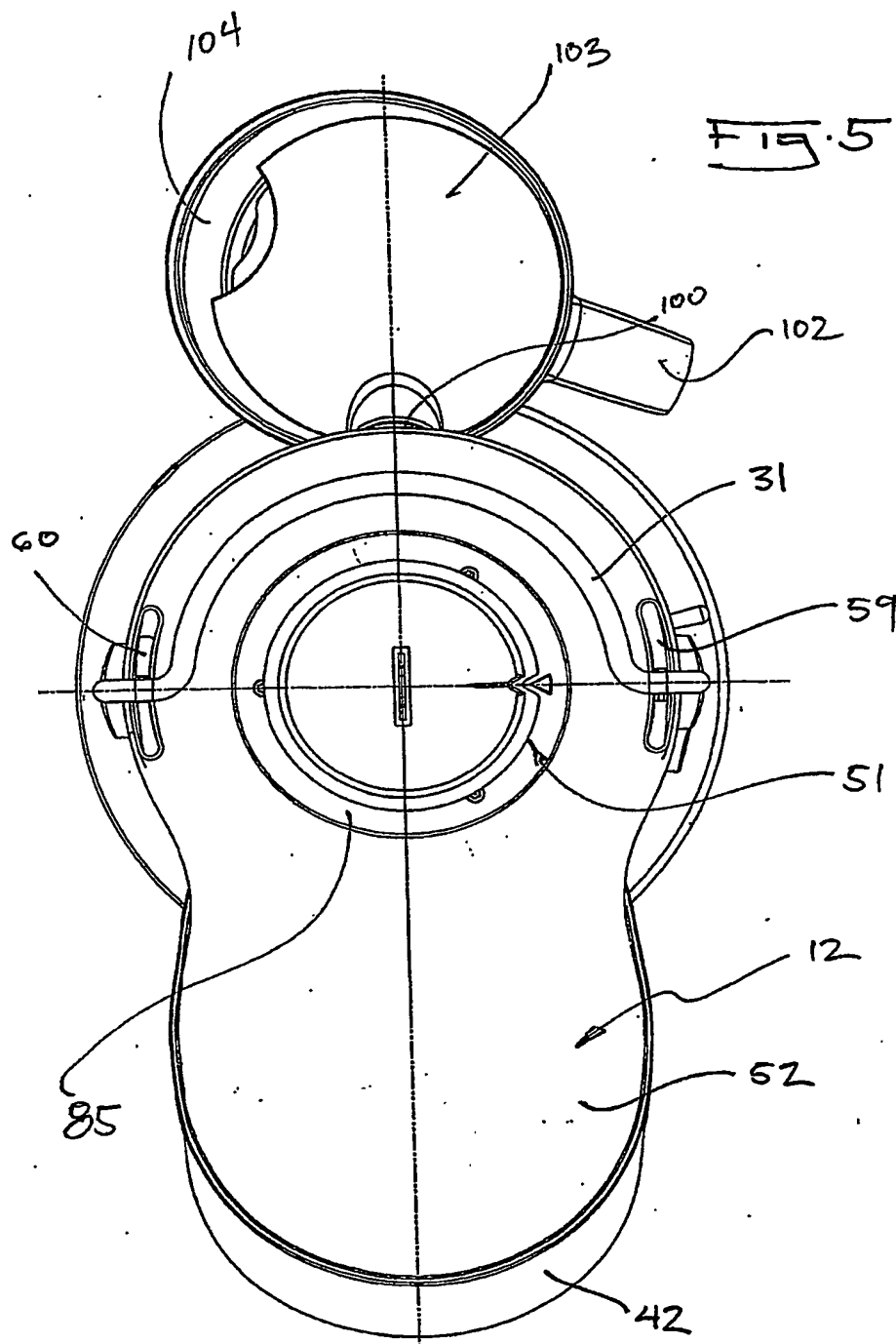
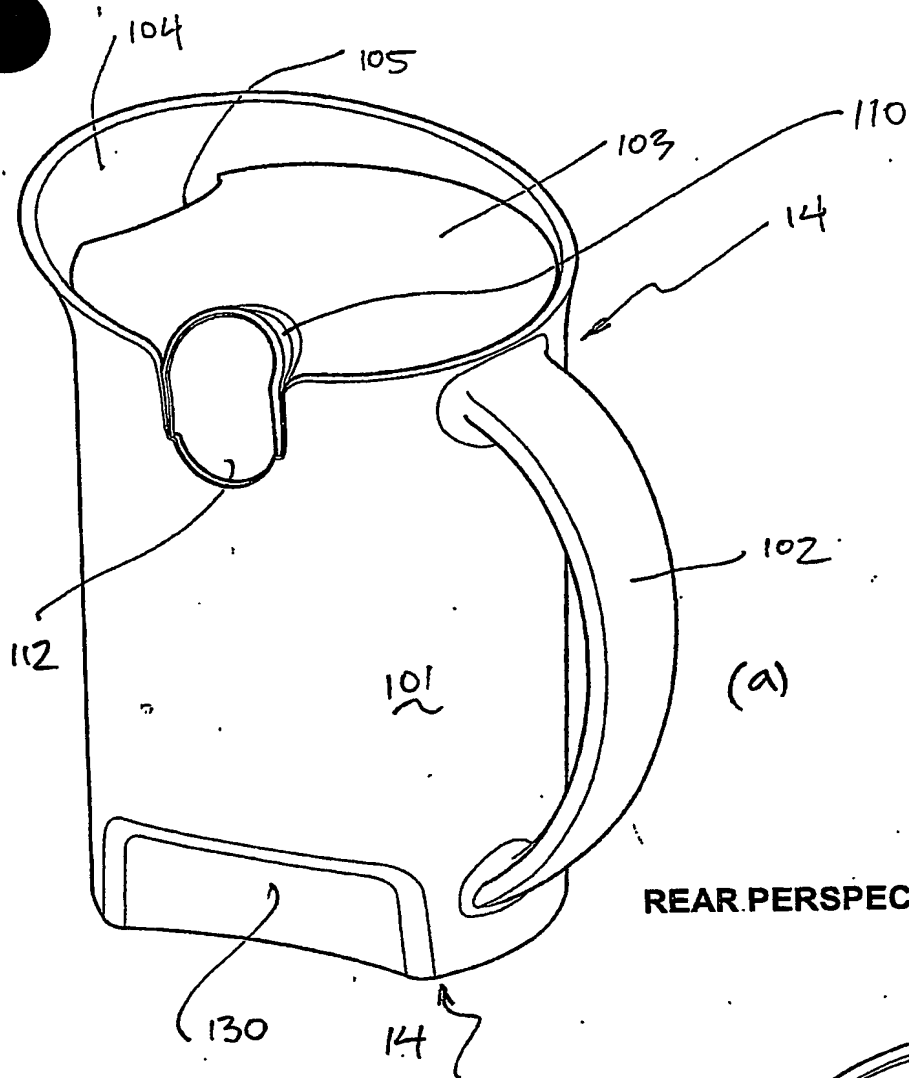


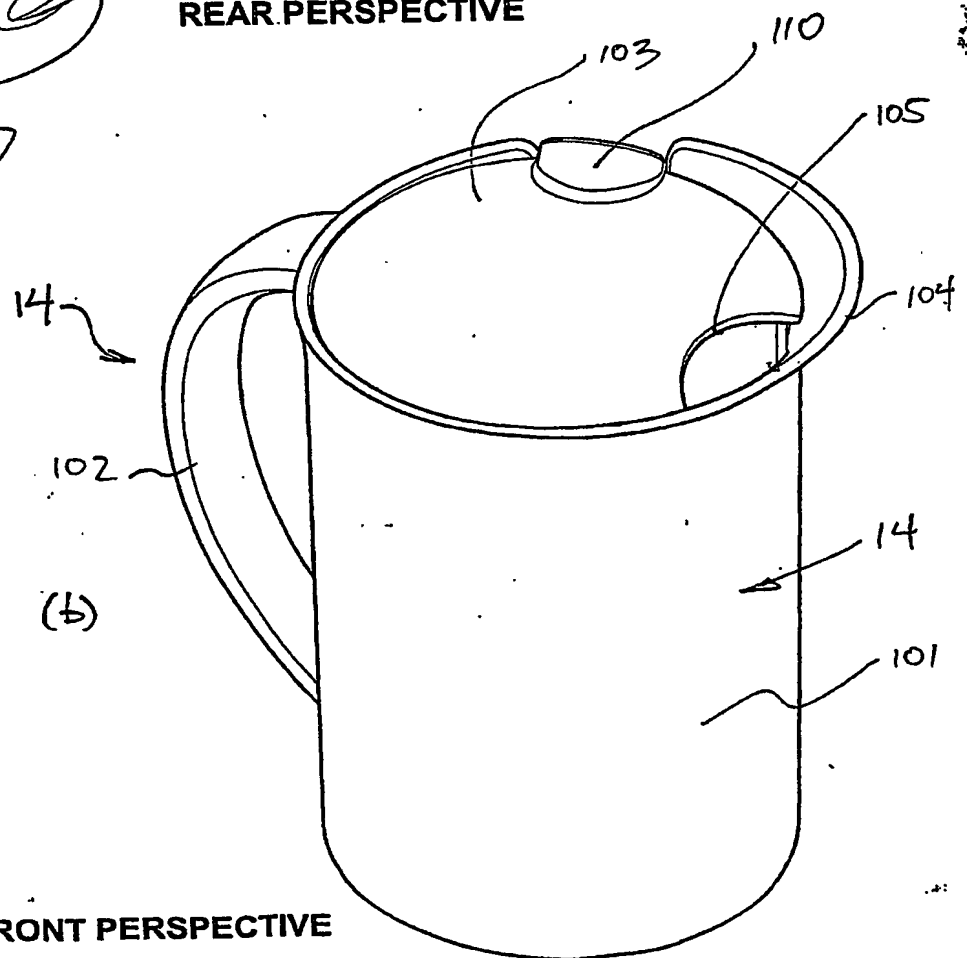
FIG. 4







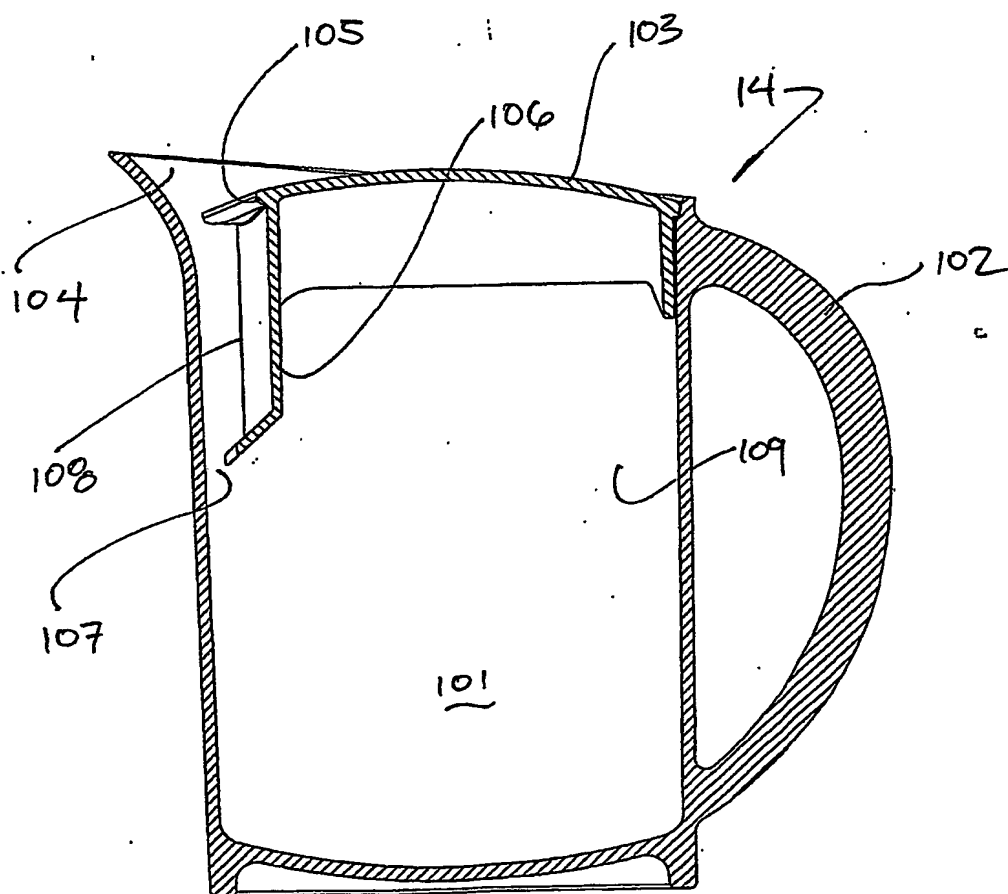
REAR PERSPECTIVE



FRONT PERSPECTIVE

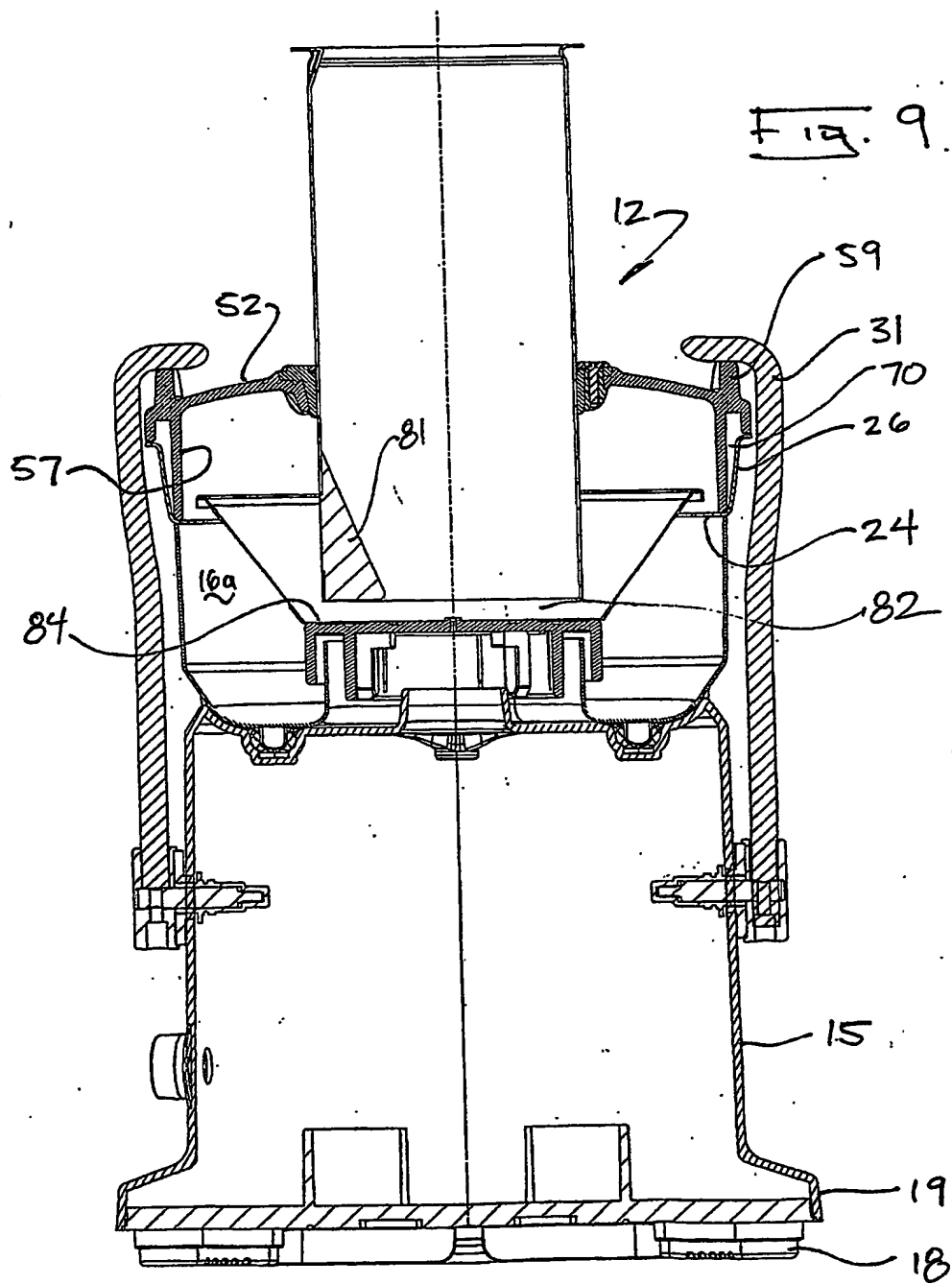
FIG. 6

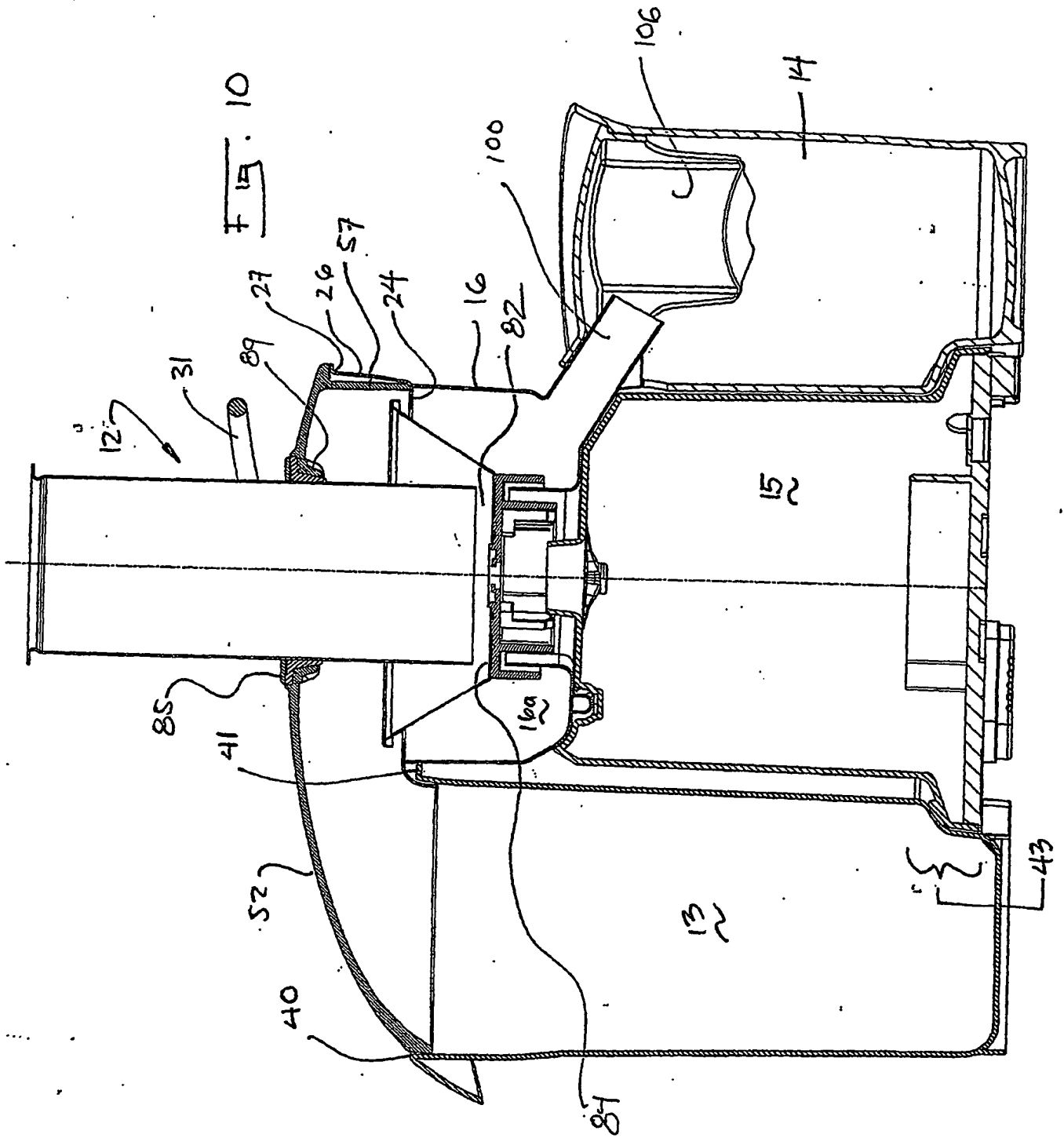
FIG. 7

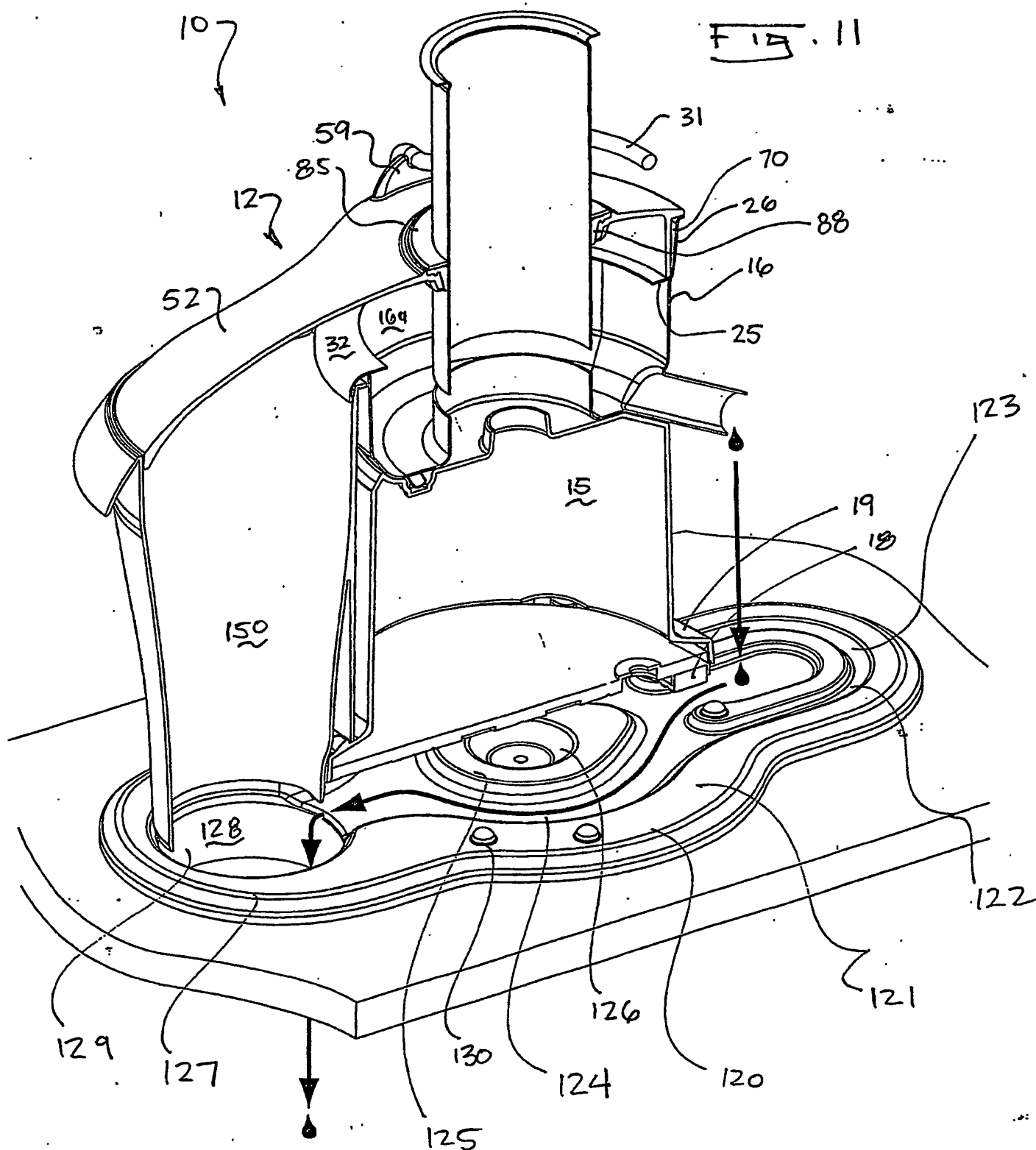












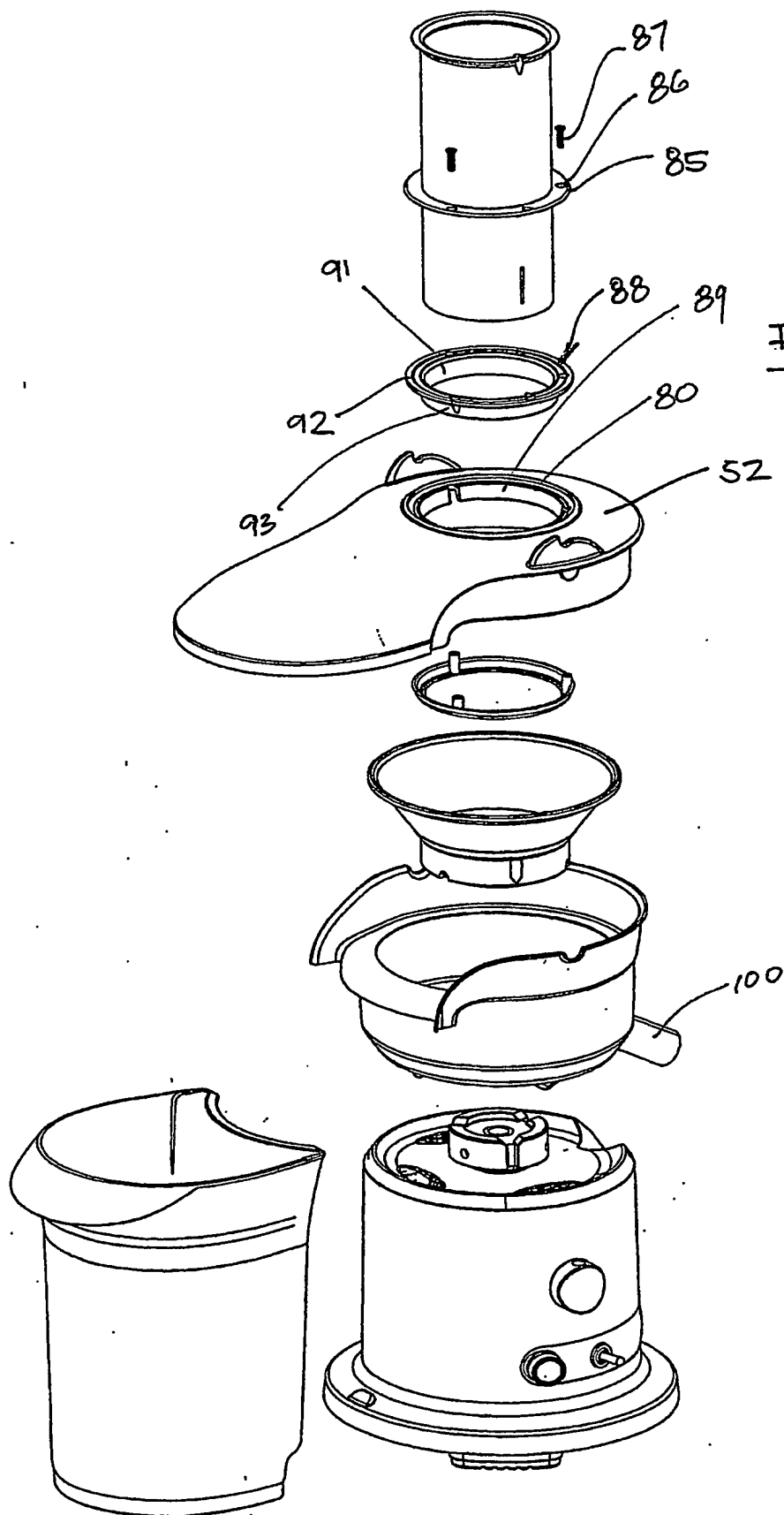
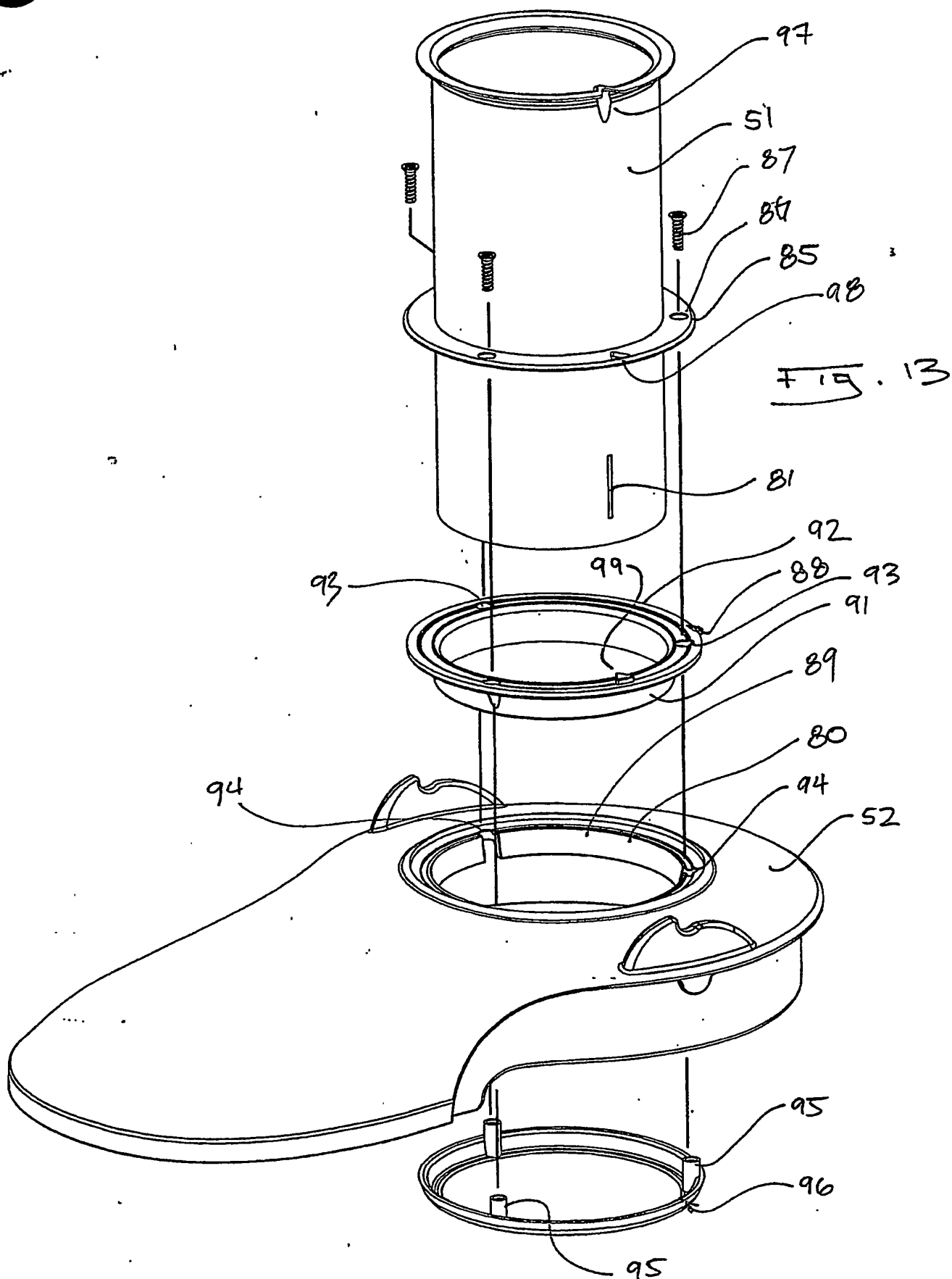


Fig. 12



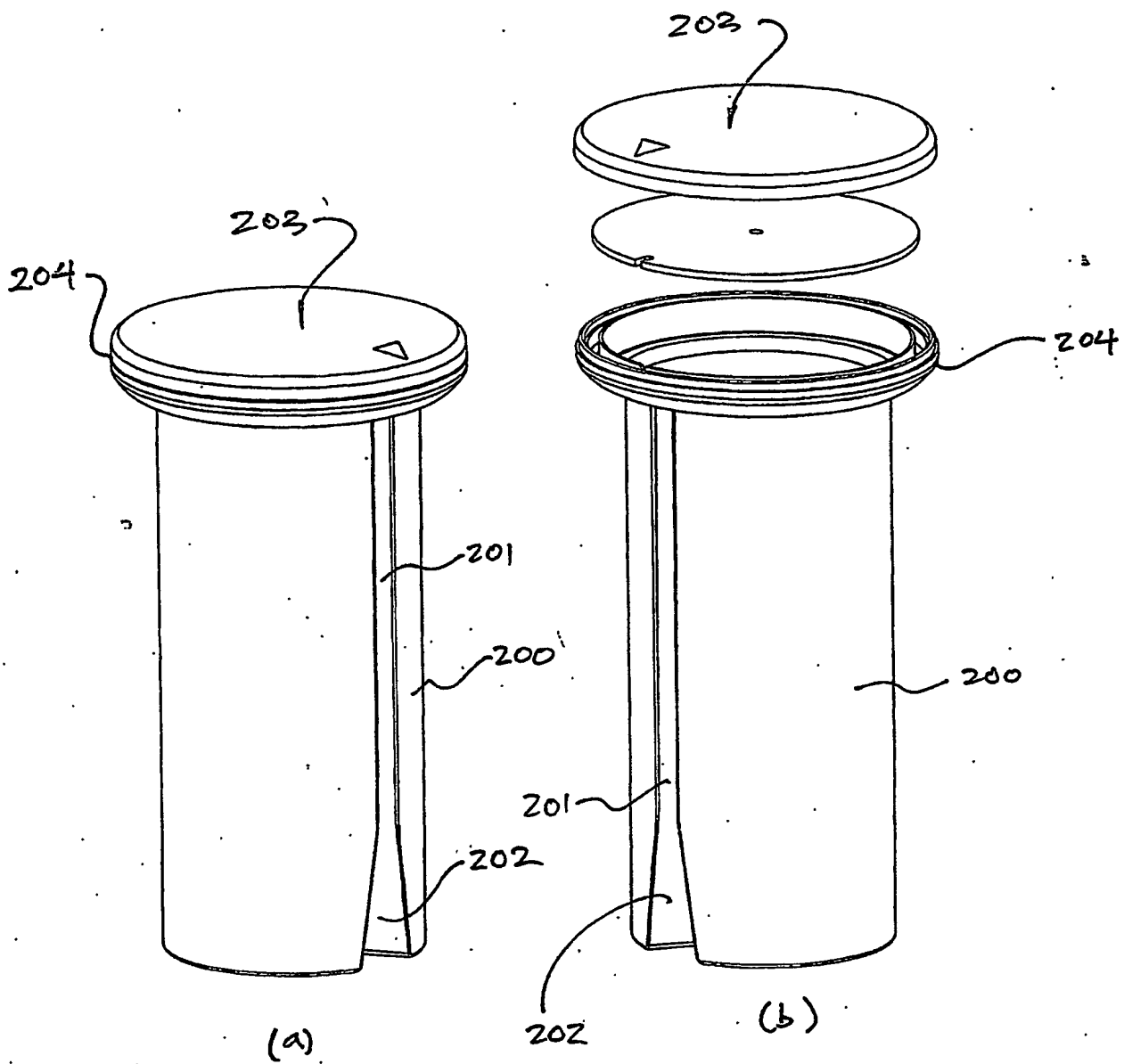


FIG. 14

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